

REMARKS

Favorable reconsideration of this application, as presently amended and in light of the following discussion, is respectfully requested.

Claims 1-13 are currently pending. Claims 1 and 10-13 have been amended by the present amendment. The changes to the claims are supported by the originally filed specification and do not add new matter.

In the outstanding Office Action, Claim 11 was objected to as containing an informality; Claims 1-13 were rejected under 35 U.S.C. § 112, second paragraph, as being incomplete for omitting essential elements, regarding the term “based on,” and regarding the structure of Claim 11; Claims 1-13 were rejected under 35 U.S.C. § 101 as being directed to non-statutory subject matter; Claims 1-10, 12, and 13 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,233,709 to Zhang et al. (hereinafter “the ‘709 patent”) in view of U.S. Patent No. 6,484,283 to Stephen et al. (hereinafter “the ‘283 patent”); and Claim 11 was rejected under 35 U.S.C. § 103(a) as being unpatentable over the ‘709 and ‘283 patents, further in view of U.S. Patent No. 6,289,486 to Lee et al. (hereinafter “the ‘486 patent”).

Applicants respectfully submit that the objection to Claim 11 is rendered moot by the present amendment to that claim. Claim 11 has been amended to be an independent claim incorporating the limitations of Claim 10.

Applicants respectfully submit that the rejections of Claims 10, 12, and 13 under 35 U.S.C. § 112, second paragraph, as omitting essential elements are rendered moot by the present amendment to those claims. Claims 10, 12, and 13 have been amended to recite a processor.

Applicants respectfully submit that the rejection of Claim 11 under 35 U.S.C. § 112, second paragraph, is rendered moot by the present amendment to Claim 11. Claim 11 has been amended to be an independent claim.

Applicants respectfully traverse the rejection of the claims under 35 U.S.C. § 112, second paragraph, regarding the term “based on.” As previously stated, Applicants respectfully submit that the use of the term “based on” in the claims is not vague or indefinite, merely broad. The claims properly broadly recite, e.g., that the step of determining a maximum number of iterations is based on the maximum error rate. In this regard, Applicants note that the Office Action asserts that “error correction schemes are implemented and designed to ensure that a maximum acceptable error rate is not exceeded; hence every aspect of an error correction scheme is based on a maximum error acceptable error rate.”¹ Applicants respectfully disagree and request that the Examiner provide a reference that teaches that “every aspect of an error correction scheme is based on a maximum acceptable error rate.” Moreover, even assuming arguendo that error correction schemes are in some way based on a maximum acceptable error rate, it does not follow that a claim that recites that a submultiple block size and a maximum number of iterations are determined based on a maximum acceptable error rate is subject to a rejection under 35 U.S.C. § 112, second paragraph, as being indefinite or as omitting essential elements. If, as the Examiner implies, one of ordinary skill in the art would understand that the determination of a submultiple block size and a maximum number of iterations would be necessarily based on the maximum acceptable error rate, then one of ordinary skill in the art clearly would not find such a limitation indefinite.

In this regard, Applicants note that the Office Action further asserts that the maximum acceptable error rate limitation might fail to “further limit the claim in which case it should be

¹ See page 8 of the outstanding Office Action.

removed.”² However, Applicants respectfully submit that even if a limitation arguably fails to “further limit” a claim, that is not grounds for a rejection under 35 U.S.C. § 112, second paragraph. Alternatively, the Office Action asserts that “the Applicant is attempting to introduce some other unknown limitation without recognizing the ramifications of the language ‘based on the maximum acceptable error rate.’”³ On the contrary, Applicants respectfully submit that the maximum acceptable error rate limitation should be interpreted using its plain ordinary mean to one of ordinary skill in the art, which the Examiner has implied is well known. Thus, in either case, the use of the phrase “based on the maximum acceptable error rate” is fully supported by Applicants’ specification and is clear and definite to one of ordinary skill in the art. Accordingly, Applicants respectfully traverse the rejection of the claims under 35 U.S.C. § 112 regarding the use of the phrase “based on”.

Applicants respectfully submit that the rejection of Claims 1-13 under 35 U.S.C. § 101 is rendered moot by the present amendment to the claims. Claim 1 has been amended to recite the step of “receiving, at a receiver, coded data sent by a transmitter.” Applicants respectfully submit that the receiving step recited in Claim 1 is not an abstract algorithm that can be carried out by hand or in a computer program and that Claim 1 is directed to statutory subject matter. Further, as discussed above, Claims 10, 12, and 13 have been amended to recite a processor and are thus directed to statutory subject matter.

Amended Claim 1 is directed to a method of optimizing a size of coded data blocks intended to be subjected to an iterative decoding process, wherein a maximum acceptable error rate of the iterative decoding process is fixed in advance, comprising: (1) receiving, at a receiver, coded data sent by a transmitter; and (2) determining, prior to performing the decoding process, but after receiving the received coded data, and based on the maximum acceptable error rate, (a) a submultiple block size among a plurality of integer block sizes

² See page 3 of the outstanding Office Action.

³ Id.

N/k, which are submultiples of an integer block size N by an integer factor k greater than or equal to 1, wherein k is a factor of N; and (b) a maximum number of iterations among a plurality of integers corresponding to a maximum number of iterations to be applied by the iterative decoding process on a coded data block of the submultiple block size, such that a mean number of iterations that will be applied by the iterative decoding process on the submultiple block size is minimized. Claim 1 has been amended to recite the step of receiving, at a receiver, coded data sent by a transmitter. The changes to Claim 1 are supported by the originally filed specification and do not add new matter.⁴

Regarding the rejection of Claim 1 under 35 U.S.C. § 103, the Office Action asserts that the ‘709 patent discloses everything in Claim 1 with the exception of determining a submultiple block size, and relies on the ‘283 patent to remedy that deficiency.

Applicants respectfully submit that the rejection of Claim 1 (and dependent Claims 3-9) under 35 U.S.C. § 103 is rendered moot by the present amendment to Claim 1.

The ‘709 patent is directed to a method and apparatus for iterative decoding of a coded information signal that allows quality of service parameters to be dynamically balanced in a telecommunications system. In particular, the ‘709 patent discloses a method for determining the maximum and minimum decoding iterations to be performed on an information signal based on a bit error rate value. However, regarding block size, the ‘709 patent merely discloses that the coded information signal is in the form of data frames. Thus, as admitted in the Office Action, the ‘709 patent fails to disclose determining a suboptimal block size among a plurality of integer block sizes N/k, as recited in amended Claim 1. Further, Applicants respectfully submit that the ‘709 patent fails to disclose determining the submultiple block size and the maximum number of iterations prior to performing the decoding process, but after receiving the received coded data, and based on the maximum

⁴ See, e.g., Fig. 7 and the discussion related thereto in the specification.

error rate, as recited in amended Claim 1. Further, the minimization of a mean number of iterations is not disclosed by the ‘709 patent, contrary to the assertion in the Office Action. Rather, as shown in Figure 2, the ‘709 patent discloses a system in which the frame processing is stopped if the convolutional redundancy code (CRC) is satisfactory or the maximum number of iterations is reached. Although the Office Action implies that this process will necessarily minimize the mean number of iteration performed by the iterative decoding process, Applicants note that the determination of the maximum number of iterations disclosed by the ‘709 patent is not determined prior to the decoding process, but after receiving the received coded data, such that the mean number of iterations will be minimized.

The ‘283 patent is directed to a method and apparatus for encoding and decoding turbo codes. In particular, the ‘283 patent discloses that the decoder can include a SISO module and can be implemented using the MAP algorithm or the SOVA algorithm. Further, as shown in Figure 2B, the ‘283 patent discloses that, in the sliding window group implementation for the SISO module, the N time steps of the full turbo code block are divided into smaller groups of Nb1 time steps for both forward and backward state metric updates. Further, the ‘283 patent discloses that Nb1 is chosen such that N is an integer multiple of Nb1. However, Applicants respectfully submit that the ‘283 patent fails to disclose determining, prior to performing the decoding process, but after receiving the received coded data, and based on the maximum error rate, a submultiple block size among a plurality of integer block sizes N/k, and a maximum number of iterations to be applied by the iterative coding process on the coded data block of the submultiple block size, such that a mean number of iterations that will be applied by the iterative decoding process on the submultiple block size is minimized, as recited in amended Claim 1. Rather, the ‘283 patent merely discloses that N time steps of the full turbo code block can be divided into smaller

groups of Nb1 time steps. However, the '283 patent fails to disclose how to select Nb1, other than as an integer multiple of N. Further, the '283 patent fails to disclose that the selection of Nb1 is based on the maximum error rate.

In this regard, Applicants note that the Office Action asserts that "Nb1 must be selected prior to decoding otherwise decoding could not take place. Furthermore, error correction schemes are implemented and designed to ensure that a maximum acceptable error rate is not exceeded; hence every aspect of an error correction scheme is based on a maximum acceptable error rate."⁵ However, Applicants respectfully submit that the '283 patent fails to disclose that Nb1 is determined prior to performing the decoding process, but after receiving the received coded data, as recited in amended Claim 1. Moreover, as discussed above, the Examiner has not provided a reference that discloses that "every aspect of an error correction scheme is based on a maximum acceptable error rate," as asserted in the Office Action. In particular, the '283 patent does not disclose that Nb1 is based on the maximum error rate.

Thus, no matter how the teachings of the '283 and '709 patents are combined, the combination fails to teach or suggest the step of determining, prior to performing a decoding process, but after receiving the received coded data, and based on a maximum error rate, a submultiple block size among a plurality of integers N/k and a maximum acceptable number of iterations to be applied by the iterative decoder process on a coded block of the submultiple block size, such that a mean number of iterations that will be applied by the iterative decoding process on the submultiple block size is minimized. In particular, Applicants respectfully submit that the combined teachings of the '709 and '283 patents fail to disclose that the submultiple block size and the maximum iterations are chosen together based on the maximum acceptable error rate prior to performing a decoding process, but after receiving the

⁵ See pages 5 and 6 of the outstanding Office Action.

received coded data such that the mean number of iterations that will be applied by the iterative decoding process on the submultiple block size is minimized. The factor Nb1 disclosed by the '283 patent is unrelated to the maximum number of iterations determined by the '709 patent. The maximum number of iterations disclosed by the '709 patent is not applied to a submultiple block size of an integer block size, as recited in amended Claim 1. Thus, there is no suggestion in either the '709 patent or the '283 patent to determine a submultiple block size and a number of iterations to be applied in an iterative decoding process on the coded data block of the sub-optimal block size, such that a mean number of iterations that will be applied is minimized.

Independent Claims 10, 12, and 13 recite limitations analogous to the limitations recited in Claim 1. Moreover, Claims 10, 12, and 13 have been amended in a manner analogous to the amendment to Claim 1. Accordingly, for the reasons stated above for the patentability of Claim 1, Applicants respectfully submit that the rejections of Claims 10, 12, and 13 are rendered moot by the present amendment to those claims.

Regarding the rejection of Claim 11 under 35 U.S.C. § 103, Applicants respectfully submit that the '486 patent fails to remedy the deficiencies of the '709 and '283 patents, as discussed above. Accordingly, Applicants respectfully submit that the rejection of Claim 11 is rendered moot by the present amendment to that claim.

Thus, it is respectfully submitted that independent Claims 1, 10, 11, 12, and 13 (and all associated dependent claims) patentably define over any proper combination of the '709, '283, and '486 patents.

Consequently, in view of the present amendment and in light of the above discussion, the outstanding grounds for rejection are believed to have been overcome. The application as amended herewith is believed to be in condition for formal allowance. An early and favorable action to that effect is respectfully requested.

Respectfully submitted,

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